

What is claimed is:

1. A microscope comprising:

a spatial phase modulator for spatial phase-modulating, into a predetermined beam shape, a first light to excite a molecule from a ground-state to a first electron excited state or a second light to excite the molecule from the first electron excited state to the second electron excited state with higher energy level, for the sample including the molecule with three electronic states including at least a ground-state;

a focusing section for focusing and overlapping a part of these first light and second light;

a light detector for detecting light generated from the sample;

a wavefront compensator provided in an optical path in the above first light and/or an optical path in the above second light; and

a wavefront aberration removal section for removing wavefront aberration caused in the first light and/or the second light by the wavefront compensator.

2. The microscope as claimed in claim 1, wherein the wavefront compensator has an optical spatial modulator.

3. The microscope as claimed in claim 2, wherein the optical spatial modulator contains a liquid crystal type spatial modulator, a deformable mirror or a micro-mirror array.

4. The microscope as claimed in claim 2, wherein the optical spatial modulator is so constructed that the first light or the second light is spatial phase modulated to the prescribed beam shape.

5. The microscope as claimed in claim 2, wherein the spatial phase distribution measuring portion for measuring the spatial phase distribution of the above first light and/or the second light, is provided, and the first light and/or the second light are spatially modulated by the optical spatial modulator based on the spatial phase distribution measured in the spatial phase distribution measuring portion.

6. The microscope as claimed in claim 5, wherein the optical spatial modulator is so constructed that the first light or the second light is spatial phase modulated to the prescribed beam shape.

7. The microscope as claimed in claim 5, wherein the control unit for

04002 (2003-26,796)

feedback controlling the spatial modulation of the first light and/or the second light according to the optical spatial modulator is provided by generating the wavefront compensation data based on the spatial phase distribution measured with the spatial phase distribution measurement portion.

8. The microscope as claimed in claim 7, wherein the optical spatial modulator is so constructed that the first light or the second light is spatial-phase modulated to the prescribed beam shape.

9. A microscope comprising:

a means for spatial phase-modulating, into a predetermined beam shape, a first light to excite a molecule from a ground-state to first electron excited state or a second light to excite the molecule from the first electron excited state to the second electron excited state with higher energy level, for the sample including the molecule with three electronic states including at least a ground-state;

a means for focusing and overlapping a part of these first light and second light;

a means for detecting light generated from the sample;

a means provided in an optical path in the above first light and/or an optical path in the above second light; and

a means for removing wavefront aberration caused in the first light and/or the second light by the wavefront compensator.